Attachment 8: Water Quality & Other Expected Benefits

Contents

WATER QUALITY & OTHER EXPECTED BENEFITS

The four projects contained in this Proposition (Prop) 84 Implementation Grant Proposal provide numerous water supply benefits to the Mokelumne/Amador/Calaveras (MAC) Integrated Regional Water Management (IRWM) Planning Region, to local communities in the region, and to the State of California. While most of these benefits are quantifiable, there are local, regional and statewide benefits that are more difficult to assign a monetary value. In summary, water quality and other benefits provided by the projects contained in this Proposal are:

- Improved potable water quality
- Reduced number of treatment plant violations
- Improved fire flows
- Stabilized water rates

These benefits generally fall into the categories of benefits associated with:

- Improved Water Quality;
- Power Cost Savings and Production;
- Conjunctive Water Management
- Helping to meet State Goals

The following is project-specific information detailing the quantitative and qualitative "Water Quality and Other Expected Benefits" provided by each of the aforementioned projects is provided below. Note, all table have been referenced to those used in the *Implementation Proposal Solicitation Package, Integrated Regional Water Management, Proposition 84, Round 1* (Prop 84 PSP, August 2010).

Lake Camanche Tank Rehabilitation & Lateral Replacement Project

Summary

The Lake Camanche Tank Rehabilitation & Lateral Replacement Project consists of improvements to the Amador Water Agency (AWA) water distribution system serving Lake Camanche Village, a disadvantaged community. The project would rehabilitate five redwood storage tanks by fabricating and lining the tanks with geomembrane liners. Lining the not only reduces water losses and increases storage capacity, but it also improves the water quality by reducing the substrate that microorganisms can grow on. In addition to the storage tank rehabilitation, the project would replace 200 leaking service laterals with ¾-inch diameter copper pipe. The existing laterals are very brittle and subject to severe longitudinal cracking, resulting in significant water losses and infrastructure damage. By lining the tanks and replacing the service laterals, AWA will ensure that sufficient water is available for emergency and drought situations and for increasing water demands in the disadvantaged community of Lake Camanche Village.

Water quality and other benefits from the Lake Camanche Tank Rehabilitation & Lateral Replacement Project potentially include:

- Improved quality of water supplied;
- Improved fire flows;
- Reducing or stabilizing water rates; and
- Reduced chlorination requirements (avoided treatment).

Of these benefits, only the reduced chlorination requirements can be quantifiably evaluated; the other benefit (improved quality of delivered water) has been qualitatively evaluated. Table 1 summarizes the project's water quality and other non-supply related benefits, while Table 2 provides a qualitative measure of several of the benefits as well as the monetary estimate of physical project costs.

Table 1: Lake Camanche Tank Rehabilitation & Lateral Replacement Project Summary of Water Quality and Non-Water Supply Benefits

Type of Benefit	Assessment Level	Beneficiaries
Improved potable supply quality	Qualitative	Local
Improved fire flows	Qualitative	Local
Reduce or stabilize water rates	Qualitative	Local
Avoided treatment costs	Quantitative	Local

Table 2: Lake Camanche Tank Rehabilitation & Lateral Replacement Project Benefit-Cost Analysis Overview

Type of Benefit	Assessment Level	Beneficiaries
Costs – Present Value of Total Capital and O&M		$484,687
Quantifiable Benefits		$21,466
	Qualitative Indicator*	
Qualitative Benefits		
Improved potable water quality	++	
Improved fire flows	++	
Reduce or stabilize water rates	+	

* Magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantifiable estimates.
++ = Likely to increase net benefits significantly

The "Without Project Baseline"

The Lake Camanche Tank Rehabilitation & Lateral Replacement Project will rehabilitate five old and leaking redwood storage tanks and replace 200 leaking laterals. Lining the storage tanks will reduce system losses by approximately 8% and will increase system storage by approximately 15%. It will also reduce the risk of coliform bacteria contamination and lower annual expenditure on chlorine treatment. Currently, the tanks are only filled to about 85% of capacity to manage leakage. The lost storage diminishes system reliability and emergency response capability.

Losses from leaking system laterals currently equals 6% to 9% of system production, or about 5.8 to 8.7 MG annually. This project would replace 200 of these laterals and reduce system losses by about 2.4 MG.

Under the No Project Condition, AWA would continue to operate the storage tanks for another 10 to 15 years, after which time they would replace the tanks with new steel tanks. Existing leaking laterals would remain in service under the No Project Condition. System loss from the leaking tanks (currently about 7.9 MG per year) and leaking laterals (currently about 2.4 MG per year) would be expected to increase at a rate of 5% per year.

Description of Water Quality and Other Expected Benefits

Implementation of the Lake Camanche Tank Rehabilitation & Lateral Replacement Project will improve the reliability of water supplies in the portion of the Amador Water System serving Lake Camanche Village. Targeted water quality and other benefits of the project include reducing required chlorination (avoided treatment costs), increasing fire flows, and improving potable water quality. Reducing system losses will also directly and immediately benefit the DAC by reducing the cost of service (achieved by cost savings associated with

decreased pumping and treatment) and by increasing the sustainability of the local the groundwater supply.

Improving system reliability is key for areas such as the Lake Camanche Village. Water system reliability is important not only from the standpoint of local water use, but for fire flow reliability. Lake Camanche Village is in a high to very high wildfire hazard area, and substandard storage will inhibit the ability to fight fires in the area, potentially leading to greater fire losses.

Redwood tanks are susceptible to bacterial growth due to the organic substrate and small animal damage to the tanks which can open up holes and allow for contamination. These bacterial quality issues are currently addressed by increased chlorination; however, lining the tanks will reduce coliform contamination risk and lower annual expenditure on chlorine treatment. Lining the tanks will allow AWA to reduce its expenditure on chlorine treatment by about $2,000 per year over a 25 year period and deliver a better-quality potable water supply to Lake Camanche Village.

Project Costs

Capital costs for tank lining and lateral replacement are taken from Table 2 of Attachment 4 (referenced as Table 7 – Project Budget in Exhibit B of the Prop 84 PSP) for the Lake Camanche Tank Rehabilitation & Lateral Replacement Project. Costs in Table 2 of Attachment 4 are expressed in 2010 dollars. Costs were converted to 2009 dollars using the CPI All Urban Consumers series (CUUROOOOSAO). Total upfront capital costs are $560,135 (2009 dollars), of which approximately half are assumed to be incurred in 2011 and half in 2012.

Reduced system loss and reduced risk of coliform contamination are expected to lower annual operating costs. These cost savings are expressed as project benefits and therefore are not presented here so as to avoid double counting. Using project costs presented in Table 3 of Attachment 7 (and referenced as Table 11 in Exhibit C of the Prop 84 Implementation PSP), the present value of the project costs is $484,687. Annual water quality benefits are summarized in Table 3, below (and referenced as Table 16 in Exhibit D of the Prop 84 PSP). Present value of reduced chlorine expenditure is $21,466.

Table 3: Lake Camanche Tank Rehabilitation & Lateral Replacement Project
Water Quality and Other Expected Benefits (referenced as Table 16 in Exhibit D of the Prop 84 PSP)

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	**Type of Benefit**	**Measure of Benefit (Units)**	**Without Project**	**With Project**	**Change Resulting from Project (e) – (d)**	**Unit $ Value** (1)	**Annual $ Value (f) x (g)** (1)	**Discount Factor** (1)	**Discounted Benefits (h) x (i)** (1)
2009	Chlorine Expense	$			0		$0	1.000	$0
2010	Chlorine Expense	$			0		$0	0.943	$0
2011	Chlorine Expense	$			0		$0	0.890	$0
2012	Chlorine Expense	$			0		$0	0.840	$0
2013	Chlorine Expense	$		2000	2000	$1	$2,000	0.792	$1,584
2014	Chlorine Expense	$		2000	2000	$1	$2,000	0.747	$1,495
2015	Chlorine Expense	$		2000	2000	$1	$2,000	0.705	$1,410
2016	Chlorine Expense	$		2000	2000	$1	$2,000	0.665	$1,330
2017	Chlorine Expense	$		2000	2000	$1	$2,000	0.627	$1,255
2018	Chlorine Expense	$		2000	2000	$1	$2,000	0.592	$1,184
2019	Chlorine Expense	$		2000	2000	$1	$2,000	0.558	$1,117
2020	Chlorine Expense	$		2000	2000	$1	$2,000	0.527	$1,054
2021	Chlorine Expense	$		2000	2000	$1	$2,000	0.497	$994
2022	Chlorine Expense	$		2000	2000	$1	$2,000	0.469	$938
2023	Chlorine Expense	$		2000	2000	$1	$2,000	0.442	$885
2024	Chlorine Expense	$		2000	2000	$1	$2,000	0.417	$835

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	**Type of Benefit**	**Measure of Benefit (Units)**	**Without Project**	**With Project**	**Change Resulting from Project (e) – (d)**	**Unit $ Value (1)**	**Annual $ Value (f) x (g) (1)**	**Discount Factor (1)**	**Discounted Benefits (h) x (i) (1)**
2025	Chlorine Expense	$		2000	2000	$1	$2,000	0.394	$787
2026	Chlorine Expense	$		2000	2000	$1	$2,000	0.371	$743
2027	Chlorine Expense	$		2000	2000	$1	$2,000	0.350	$701
2028	Chlorine Expense	$		2000	2000	$1	$2,000	0.331	$661
2029	Chlorine Expense	$		2000	2000	$1	$2,000	0.312	$624
2030	Chlorine Expense	$		2000	2000	$1	$2,000	0.294	$588
2031	Chlorine Expense	$		2000	2000	$1	$2,000	0.278	$555
2032	Chlorine Expense	$		2000	2000	$1	$2,000	0.262	$524
2033	Chlorine Expense	$		2000	2000	$1	$2,000	0.247	$494
2034	Chlorine Expense	$		2000	2000	$1	$2,000	0.233	$466
2035	Chlorine Expense	$		2000	2000	$1	$2,000	0.220	$440
2036	Chlorine Expense	$		2000	2000	$1	$2,000	0.207	$415
2037	Chlorine Expense	$		2000	2000	$1	$2,000	0.196	$391
Project Life									
								Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table) Transfer to Table 20, column (f), Exhibit F: Proposal Costs and Benefits Summaries	**$21,466**
Comments: Lining storage tanks would lower risk of coliform contamination and allow the district to reduce chlorine treatment, yielding an annual savings of $2000 over 25 years.									

Distribution of Project Benefits and Identification of Beneficiaries

The water quality and other benefits previously described will accrue to local households in the Lake Camanche Village. However, some of the water supply benefits (reduced water loss, reduced power requirements and reduced Mokelumne River/Camanche Reservoir diversion described in Attachment 7) has the potential to generate regional and statewide benefits (e.g. improved ability to meet Statewide 20x2020 water use targets and reduced power-related greenhouse gas emissions).

Project Benefits Timeline Description

Implementation of the Lake Camanche Tank Rehabilitation & Lateral Replacement Project will result in immediate improvement in water pressure, capacity and fire flow for the Lake Camanche Village community and will result in immediate reduction in chlorination requirements. Implementation of this project will result in 0% uncertainty associated with these benefits as the replacement and rehabilitation practices and technology to be implemented are industry standard and have proven reliability. Implementation of the project will also, with a low degree of uncertainty, improve the quality of stored water delivered to Lake Camanche Village and will reduce or stabilize water rates for the community.

Potential Adverse Effects from the Project

Possible impacts to Lake Camanche Village and the environment from project implementation are all short-term construction-related impacts and may included temporary increases in traffic and noise. Mitigation measures will be implemented during construction to minimize potential impacts, and all impacts will be less than significant in nature.

Summary of Findings

With respects to water quality and other non-water supply-related benefits, implementation of the Lake Camanche Tank Rehabilitation & Replacement Project will provide a cleaner, more reliable supply of potable water for the local community and ensure sufficient supplies are in place during period of drought and/or emergency (i.e. wild fires). The tank linings will improve the quality of water stored in the tanks, reducing the amount of chlorination required and providing a better-quality potable supply to Lake Camanche Village. The project will also help to reduce or stabilize water rates in the Lake Camanche Village by reducing system operations and maintenance costs which will, in turn, allow AWA to continue to operate the system without significant rate increases.

References

Personal communications with Gene Mancebo, General Manager, Michael Lee, Financial Services Manager, and Erik Christeson, Interim Manager of Engineering & Planning, November and December 2010.

Amador Water System Leak Detection & Repair Program

Summary

The Amador Water System (ASW) Leak Detection & Repair Program is a phased project in which Amador Water Agency (AWA) will first install a system of eighteen "master meters" on key pipelines within the AWS to determine those which have the most significant leakage (and thus the greatest need for repair or replacement), and then develop and implement a prioritized list of repairs to reduce overall system water losses. The first phase of the project (for which grant funding is being requested) consists of the master meter installation, leak identification and project prioritization. The actual replacement and rehabilitation of water conveyance facilities within the AWS will be implemented during later phases of the project and will be funded with AWA reserves, through other available grants and/or through water rate recovery.

Non-water supply benefits from implementation of Phase 1 of the AWS Leak Detection & Repair Program potentially include reducing or stabilizing water rates to customers.

Table 4: Amador Water System Leak Detection & Repair Program
Summary of Water Quality and Non-Water Supply Benefits

Type of Benefit	Assessment Level	Beneficiaries
Reduce or stabilize water rates	Qualitative	Local

Table 5: Amador Water System Leak Detection & Repair Program
Benefit-Cost Analysis Overview

Type of Benefit	Assessment Level	Beneficiaries
Costs – Present Value of Total Capital and O&M		$593,914
Quantifiable Benefits		N/A
	Qualitative Indicator*	
Qualitative Benefits		
Reduce or stabilize water rates	+	

* Magnitude of effect on net benefits:
\+ = Likely to increase net benefits relative to quantifiable estimates.
++ = Likely to increase net benefits significantly

This benefit can only be qualitatively analyzed, and will accrue to local households in the Amador Water System distribution. However, some of the water supply benefits (reduced water loss and reduced Mokelumne River diversion as described in Attachment 7) has the potential to generate regional and statewide benefits (e.g. improved ability to meet Statewide 20x2020 water use targets and reduced power-related greenhouse

The "Without Project Baseline"

The first phase of the Amador Water System Leak Detection & Repair Program will master meters at key points in the system that will be used to monitor flows and identify locations of water losses. Subsequent phases will implement a system leak testing and repair program.

Under the No Project Condition, the system would continue to be operated as it is at present, system losses would approach 7%, and main breaks would be repaired as they occur.

Description of Water Quality and Other Expected Benefits

Implementation of the Amador Water System Leak Detection & Repair Program will not initially provide any water quality or other non-water supply benefits. Once subsequent phases of the project are implemented (that is, the prioritized list of repair and replacement projects resulting from the first project phase is implemented), AWA will reduce system losses which will, in turn, reduce water production costs. This cannot be quantified at this time as the location and magnitude of leaks in the AWS have not yet been identified. However, reduced treatment and delivery costs associated with the water savings will allow AWA to put off development of new water supply projects which will, in turn, allow them to stabilize (not increase) water rates.

Distribution of Project Benefits and Identification of Beneficiaries

The water quality and other benefits identified herein will accrue to local households in the Amador Water System. However, some of the water supply benefits (reduced water loss, reduce treatment requirements and associated reduced Mokelumne River diversion described in Attachment 7) has the potential to generate regional and statewide benefits (e.g. improved ability to meet Statewide 20x2020 water use targets and reduced power-related greenhouse gas emissions).

Project Benefits Timeline Description

Implementation of the first phase of the Amador Water System Leak Detection & Repair Program will not result in immediate benefits. However, the project will provide a prioritized list of repairs and replacements for reducing water losses on the AWS, and once these repair/replacement projects have been implemented, benefits will be accrued proportionally to the leaks that are repaired. There is a moderate degree of uncertainty associated with the benefits as described here. This uncertainty stems from lack of knowledge as to the number, location and magnitude of leaks in the AWS. However, there is a low degree of uncertainty associated with obtaining the benefits of the leak repairs once the leaks have been identified.

Potential Adverse Effects from the Project

Possible impacts resulting from Phase 1 project implementation are all short-term construction-related impacts and may included temporary increases in traffic congestion and noise. All meters will be located on AWS mains which are located under paved surfaces. Mitigation measures will be implemented during construction to minimize potential impacts, and all impacts will be less than significant in nature.

Summary of Findings

With respects to water quality and other non-water supply-related benefits, implementation of the Amador Water System Leak Detection & Repair Program will reduce AWS water losses and will therefore concurrently reduce costs associate with the treatment and distribution of that water. To that end, identifying the AWS leaks (which is the Phase 1 project) and repair those leaks (in subsequent project phases) will allow AWA to delay development of new water projects and reduce O&M costs of the existing system, which will, in turn, allow them limit future water rate increases for system customers.

References

Personal communications with Gene Mancebo, General Manager, Michael Lee, Financial Services Manager, and Erik Christeson, Interim Manager of Engineering & Planning, November and December 2010.

West Point Water Main & Tank Replacement Project

Summary

The West Point Water Main & Tank Replacement Project consists of replacing deteriorating water mains and a leaking redwood water storage tank in the portion of the Calaveras County Water District (CCWD) service area providing potable water supplies to the disadvantaged community of West Point. This project is important for West Point both from a water supply reliability standpoint and from a safety standpoint. Not only does the redwood water storage tank leak, but it is also susceptible to fire, which could lead to a catastrophic failure of the water system should a wildfire occur. The water main replacement will include 3,900-feet of 12-inch transmission main along Winton Road between the water treatment plant and downtown West Point and an additional 2,700 feet of water mains within the downtown area along Main Street and Pine Street. A new 50,000-gallon ignition-resistant steel water storage tank will replace the leaking redwood tank and 1,500 feet of galvanized steel line to the tank will be replaced with PVC pipe.

Water quality and other non-water supply benefits from the West Point Water Main & Tank Replacement Project potentially include:

- Improved quality of water supplied
- Improved fire flows
- Potentially lower prices of water due to reduced treatment costs and water loss
- Leveraging of existing funds

Although insufficient data exists to quantify all benefits at this time, some physical measures can be used to highlight the importance and magnitude of these measures. Table 6 lists the benefit categories for the project, while Table 7 provides a qualitative measure of several of the benefits as well as the monetary estimate of physical project costs.

Table 6: West Point Water Main & Tank Replacement Project
Summary of Water Quality and Non-Water Supply Benefits

Type of Benefit	Assessment Level	Beneficiaries
Improved potable supply quality	Qualitative	Local
Improved fire flows	Qualitative	Local
Reduce or stabilize water rates	Qualitative	Local
Leveraging of existing funds	Qualitative	Local

Table 7: West Point Water Main & Tank Replacement Project
Benefit-Cost Analysis Overview

Type of Benefit	Assessment Level	Beneficiaries
Costs – Present Value of Total Capital and O&M		$1,194,295
Quantifiable Benefits		N/A
	Qualitative Indicator*	
Qualitative Benefits		
Improved water quality	+	
Improved fire flows	++	
Reduce or stabilize water rates	+	
Leveraging of existing funds	++	

* Magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantifiable estimates.
++ = Likely to increase net benefits significantly

The "Without Project Baseline"

The West Point Water Main & Tank Replacement Project will replace an old, leaking redwood storage tank and replace undersized and leaking mains in the West Point water system. Under the No Project Condition, the system would continue to be operated as it is at present. System losses would exceed the current 25% loss rate, main breaks would be repaired as they occur, and fire flow capacity would remain substandard.

Description of Water Quality and Other Expected Benefits

Targeted water quality and non-water supply benefits of the West Point Water Main & Tank Replacement Project include increasing fire flows and improving potable water quality. Reducing system losses will also directly and immediately benefit the DAC by reducing the cost of service (achieved by cost savings associated with decreased pumping and treatment) and will benefit the region and the state through the reduction of power-related greenhouse gas emissions associated with the avoided water pumping and treatment requirements.

Improving system reliability is key for areas such as West Point. Water system reliability is important not only from the standpoint of local water use, but for fire flow reliability. West Point is in a very high wildfire hazard area (per the California Department of Forestry & Fire Protection), and the existing substandard storage and distribution system is currently preventing new development (insurance agencies will not protect businesses in West Point due to the substandard distribution system) and is inhibiting the ability to fight fires in the area, potentially leading to greater fire-related losses. Additionally, many structures in the West Point community are old and were constructed prior to current fire codes; therefore a water supply system capable of meeting local fire fighting needs is essential for the protection of the community. The proposed project will reduce or eliminate the extreme risk of a potable water supply loss over an extended period of time due to a large damaging fire with a 100% chance of occurring in any given year. As identified in CCWD's FEMA-approved Multi-Hazard Mitigation Plan (MHMP) and Tuolumne-Calaveras Unit Pre-Fire Management Plan, completed in 2005 by the Tuolumne-Calaveras Unit (TCU) of the California Department of Forestry and Fire Protection (CDF), water is the primary asset to fighting large damaging fires. Replacing the at-risk redwood storage tank in West Point with a steel tank of ignition-resistant material and replacing substandard water mains, combined with well-maintained defensible spaces, will reduce or eliminate the loss of a community's potable water supply system for an extended period of time due to a large devastating fire, while also ensuring fire fighting capacity in the area, ultimately saving human lives and structures and allowing for future economic development in this disadvantaged community.

Finally, redwood tanks are susceptible to bacterial growth due to the organic nature of the tanks and small animal damage to the tanks which can open up holes and allow for contamination by animal matter. These bacterial quality issues are currently addressed by increased chlorination; however, replacing the existing redwood tank with a steel tank will inhibit small animal contact, prevent bacterial growth, and will, overall, reduce bacterial loading to the water supply. This, in turn, will reduce chlorination requirements on the

stored water supply, leading to delivery of a better-quality potable water. In addition, the new Surface Water Treatment Rule, promulgated by the California Department of Public Health to protect drinking water standards, has established limits on the presence of Haloacetic Acids (HAAs) and Disinfection By-Products (DBPs). Both constituents are significant concerns because of the interaction with organics found in redwood storage tanks. The redwood storage tank organic material reacts with the chlorine residual required for transmitting safe drinking water to form the HAAs and DBPs. Violation of the new surface water treatment rule requires increased testing and costs associated with the violations. As a result, CCWD is forced to operate the redwood storage tanks at a lower level risking storage and fire flow capabilities to ensure sufficient flushing of flows through the tank to minimize the risk of violating the new HAA / DBP limits. Replacement of the redwood storage tanks with new ignition resistant steel tanks will eliminate this problem.

Finally, receipt of grant funding for this project will allow CCWD to leverage other funding opportunities. At present, the U.S. Department of Agriculture Rural Development Program (USDA RD) has offered CCWD $3.29 million in a loan and $1 million in grant funds for water system improvements in West Point. However, because of the small rural community's economics, the lack of funds, and the economic downturn, no funds exist to take on the large loan debt, even with the proffered grant. The USDA RD has offered to maintain the grant component and reduce the loan component if state grant dollars are secured. By combining Proposition 84 IRWM fund received via this grant application with the proffered USDA funding, CCWD can implement the West Point Water Main & Tank Replacement Project and leverage its remaining monies to improving its distribution system in the West Point, Wilseyville and Bummerville areas.

Distribution of Project Benefits and Identification of Beneficiaries

Water quality and other non-water supply benefits will accrue mostly to local households in the community of West Point. However, reduced water loss, reduce power requirements (relative to avoided treatment costs) and reduced Calaveras River diversions (also relative to avoided diversion and treatment costs) has the potential to generate regional and statewide benefits (e.g. improved ability to meet Statewide 20x2020 water use targets and reduced power-related greenhouse gas emissions).

Project Benefits Timeline Description

The West Point Water Main & Tank Replacement Project will replace deteriorating water mains and a leaking redwood water storage tank currently serving the community of West Point. West Point is a DAC of approximately 560 connections served by Calaveras County Water District. Conditions of the West Point system are so deteriorated that CCWD estimates that 25% of the treated water conveyed to the system is unaccounted for due to leaks. The water system is one of the oldest in the area, and is insufficient in terms of capacity to deliver fire flows and overall supply reliability. Implementation of the West Point project will provide immediate improvement in water savings, water pressure, capacity and fire flow for the community. Implementation of this project will result in 0% uncertainty associated with

the benefits as the replacement practices and technology to be implemented are industry standard and have proven reliability.

Potential Adverse Effects from the Project

Possible impacts to West Point and environs from project implementation are all short-term construction-related impacts and may include temporary increases in traffic congestion and noise. All construction will take place in paved areas; therefore no significant environmental impacts are expected. Mitigation measures will be implemented during construction to minimize potential impacts, and all impacts will be less than significant in nature.

Summary of Findings

With implementation of the West Point Water Main & Tank Replacement Project, water storage capacity will be increased as a result of the tank replacement, providing a cleaner, more reliable supply of potable water for the West Point community and ensuring sufficient supplies are in place during period of drought and/or emergency (i.e. wild fires). The new steel tank will be ignition-resistant, and will improve the quality of water stored in the tanks, reducing the amount of chlorination required and providing a better-quality potable supply to West Point. The project will also increase the reliability of water supply deliveries through the replacement of leaking water mains, reducing the risk of disruptions during peak demand or emergencies such as wild fires. Additionally, local, regional and statewide communities will benefits from reduced losses, which will help meet statewide targets for potable water use reductions and associated reductions in demands on the Calaveras River. And finally, the DAC of West Point will benefit in that project implementation will allow CCWD to delay development of new water projects (as a result of the loss reductions) and reduce O&M costs of the existing system, which will, in turn, allow them limit future water rate increases for system customers.

References

Personal communications with Edwin Pattison, Water Resources Manager, and Steve Hutchings, District Engineer, November and December 2010.

Camanche Regional Water Treatment Plant Phase 1 Project

Summary

In the late 1990s, representatives from EBMUD, AWA and CCWD (together with the local community) identified that there was a shared need to address water supply and quality issues that each agency faced within the areas surrounding Camanche Reservoir. An analysis of delivered water to customers in the area indicated concerns regarding water quality issues in addition to reliability concerns. Subsequently, a partnership between the three water supply agencies was formed, and the concept of a modernized regional WTP serving the combined localized needs of said agencies was envisioned. Since that time, work on the effort has included preliminary engineering efforts as well as environmental review. The need for the project was seen as critical, hence warranting its inclusion in the 2006 MAC IRWM Plan.

At present, Camanche South Shore Recreation Area (CASS) is served by a pumped raw water supply from Camanche Reservoir, treated at an aging WTP. This plant has been experiencing water quality concerns and violations, including violations of the current Surface Water Treatment Rules for multi-barrier treatment and taste and odor concerns resulting from fluctuating H_2S levels at the plant and underfeeding of $KMnO_4$. In addition, since Camanche Reservoir is the plant's water source (and since the Reservoir serves as a recreational feature for the local community), there tends to be a high bacteria and turbidity loading in the raw water supply, adding stress to the WTP treatment processes. Other local water supply and quality concerns in the Camanche Reservoir area include issues relating to groundwater contamination and overdraft. The Camanche North Shore Recreation Area (CANS) and the Calaveras communities of Burson and Wallace are dependent upon groundwater as their primary supply source. In these areas, wells have been drying up at an alarming rate due to aquifer overdraft and the communities have been experiencing increasing groundwater quality issues from arsenic, boron, iron and/or manganese.

The Camanche Regional WTP Project, as a whole, includes the design and construction of a 0.5 MGD membrane filtration water treatment plant at CASS, a new gravity raw water pipeline to provide raw water from the Mokelumne Aqueducts (as an alternative to the existing pumped Camanche Reservoir supply) to the new treatment plant (the Phase 1 project for which grant funding is being sought), and a new cross-Camanche Reservoir treated water pipeline from CASS WTP to provide treated water to the CANS. The 0.5 MGD plant will be designed such that it can be expanded to treat up to 2.0 MGD without significant building or facility alteration. This additional capacity would be used to supply neighboring areas of Amador and Calaveras Counties, including the Lake Camanche Village area (a DAC), Burson and Wallace, as needed and as based on a number of factors (water supply, water quality, water rights, future infrastructure, etc.).

The Camanche Regional Water Treatment Plant Project is a regional project that will benefit numerous areas within the MAC IRWM planning region. Once the Camanche Regional Water Treatment Plant Project is fully implemented, it will help address the water needs of

the three separate water system purveyors (AWA, CCWD, and EBMUD). A phased approach will be applied relative to the project's design and construction. Phase 1 of the overall Camanche Regional Water Treatment Plant Project is a discrete component involving installation of a pipeline that will initially connect the existing Camanche WTP with EBMUD's Mokelumne Aqueducts in order to supply an alternative better-quality raw water source for production of higher-quality portable water for use in the CASS. Following implementation of subsequent project phases (specifically, construction of the new Camanche Regional WTP), the new Mokelumne Aqueduct to CSS WTP pipeline will connect to the new water treatment plant and ultimately produce higher-quality potable water for CASS and CANS. With additional infrastructure investments and water rights changes, the system can be connected to the Lake Camanche Village area in Amador County, and the communities of Burson and Wallace in Calaveras County.

Water quality and other benefits from the Camanche Regional Water Treatment Plant Phase 1 Project potentially include:

- Improved quality of water supplied
- Compliance with State drinking water regulations at the existing Camanche Water Treatment Plant
- Reduced energy consumption (109,200 Kwh annually)
- Reduced carbon footprint (144,000 lbs of CO2 emissions)

Long-term, after all components of the Camanche Regional Water Treatment Plant have been constructed, additional water quality and other benefits of the overall project will include:

- Greater reliability of water supply
- Improved potable water quality
- Reduced dependence on groundwater (improving the sustainability of the underlying groundwater basin)
- Conjunctive use opportunities
- Potentially lower prices of water due to reduced treatment costs and economy of scale

The Camanche Regional Water Treatment Plant Project will also provide ancillary benefits to the Camanche Reservoir area. EBMUD operates a wastewater treatment plant in the vicinity of the existing water treatment plant – the Camanche Area South Shore Wastewater Treatment Plant. The CASS Wastewater Treatment Plant has capacity limitations, primarily as a result of the plant's series of facultive ponds with final effluent disposal via spray fields. These ponds are often near capacity during the winter months when rainfall prevents spraying. The existing CASS WTP discharges large volumes of backwash water to the CASS Wastewater Plant, and due to plant treatment capacity, there are concerns that discharges may approach regulatory limits for certain pollutants during wet weather conditions (in violation of NPDES permit limits). The proposed regional water treatment plant would

largely eliminate this influent source and hence resolve the capacity limitations of the wastewater system

Although insufficient data exists to quantify the benefits of the Phase 1 and overall project at this time, some physical measures can be used to highlight the importance and magnitude of these measures. Table 8 lists the benefit categories for the Phase 1 Project, while Table 9 provides the same information for the overall Project. A qualitative measure of several of the benefits as well as the monetary estimate of physical project costs for the Phase 1 project are included in Table 10.

Table 8: Camanche Regional Water Treatment Plant Phase 1 Project
Summary of Water Quality and Non-Water Supply Benefits

Type of Benefit	Assessment Level	Beneficiaries
Improved potable supply quality	Qualitative	Local
Eliminate water treatment violations	Qualitative	Local

Table 9: Camanche Regional Water Treatment Plant Project
Summary of Water Quality and Non-Water Supply Benefits

Type of Benefit	Assessment Level	Beneficiaries
Improved potable supply quality	Qualitative	Local
Eliminate water treatment violations	Qualitative	Local
Reduced water rates due to economies of scale	Qualitative	Local, Regional

Table 10: Camanche Regional Water Treatment Plant Phase 1 Project
Benefit-Cost Analysis Overview

Type of Benefit	Assessment Level	Beneficiaries
Costs –Present Value of Total Capital and O&M		$604,817
Quantifiable Benefits		N/A
	Qualitative Indicator*	
Qualitative Benefits		
Improved potable supply quality	++	
Eliminate water treatment violations	++	

* Magnitude of effect on net benefits:
\+ = Likely to increase net benefits relative to quantifiable estimates.
++ = Likely to increase net benefits significantly

The "Without Project Baseline"

The Camanche Regional Water Treatment Plant Phase 1 Project will construct the Mokelumne Aqueduct to CSS WTP pipeline. This pipeline will be approximately six miles long, and will be constructed of 12-inch diameter HDPE piping. The pipeline will initially connect two of the three EBMUD Mokelumne Aqueducts to the existing water treatment plant at CASS in order to provide higher-quality raw water to the existing plant (and correspondingly better treated water to residents). As such, the Phase 1 project will, alone, provide a reliable, long-term high-quality alternative supply of water to the existing Camanche Water Treatment Plant. The reduced bacterial loading on the existing water treatment plant will improve the plant's performance, reduce the number of violation notices that have been occurring at the aging treatment plant, and provide a better-quality water to local users. Additionally, use of Pardee Reservoir water as the raw water source for the existing WTP will extend the useful life of the plant until such time the new plant can be constructed.

Once the new water treatment plant has been constructed, along with the cross-Camanche pipeline (subsequent phases of the larger project), the overall project will not only continue to provide high-quality water to the Camanche South Shore Recreation area, but will also be providing a similar high-quality supply to the Camanche North Shore Recreation Area. Upon resolution of infrastructure interconnection and water rights issues, water can be supplied to Burson, Wallace, and other near-by communities. Ultimately, the project will both improve potable water quality and water supply reliability in the Amador and Calaveras County communities bordering Lake Camanche.

Under the No Project Condition, EBMUD would continue to operate the existing Camanche Water Treatment Plant, without upgrades, and continue to use Camanche Reservoir as the source of raw water. While the overall volume of water treated at the plant will not likely change in the near future, the ability of the plant to treat the Camanche raw water will deteriorate, resulting in an increasing number of Surface Water Treatment Rule violations. Historically, EBMUD has reported the violations to the California Department of Public Health, but there have been no monetary fines or other repercussions associated with the violations. This could potentially change as the number of violations increase and as the quality of treated water degrades. Ultimately, at some point in the future, the existing water treatment plant will be unable to meet drinking water standards or will acutely fail. At this time, the treatment plant will either be closed or will require significant upgrades in order to provide suitable potable water supplies.

Description of Water Quality and Other Expected Benefits

As previously noted, water quality and other non-water supply benefits from the Camanche Regional Water Treatment Plant Phase 1 Project potentially include:

- Improved quality of water supplied
- Compliance with State drinking water regulations at the existing Camache Water Treatment Plant

In general, construction of the Phase 1 project will improve the quality of water treated at the existing Camanche WTP by simply improving the quality of raw water supplied to the plant. Similarly, reducing the bacteria loading to the WTP (by providing the higher quality raw water) will result in fewer Surface Water Treatment Rules violations at the plant.

Long-term, after all components of the Camanche Regional Water Treatment Plant have been constructed, water quality and other non-water supply benefits of the overall project will include:

- Improved potable water quality
- Compliance with State drinking water regulations
- Potentially lower prices of water due to reduced treatment costs and economy of scale

The new plant will be designed to produce potable water compliant with both existing and foreseeable drinking water regulations. Because the water will come from the Mokelumne Aqueducts, and as the aqueducts are vital to EBMUD's ability to provide water to their service area in the San Francisco Bay Area, the source of water to the new Camanche Regional WTP will be more reliable and will, accordingly, provide a more reliable source of water to local Camanche Reservoir communities. Finally, because the new treatment plant and distribution system will be regional in nature, there will be cost savings to these small communities resulting from the economy of scale associated with larger treatment plants and water systems. This will help to maintain local water rates at levels comparable to current levels and help to maintain them within the economic means of these communities.

Project Costs

Capital costs for the Camanche Regional Water Treatment Plant Phase 1 Project are included in Table 26 of Attachment 4 (reference as Table 7 in Exhibit B of the Prop 84 PSP) and are expressed in 2010 dollars. Costs were converted to 2009 dollars using the CPI All Urban Consumers series (CUUROOOOSAO). Total upfront capital costs are $720,020 (2009 dollars).

No quantitative analysis was prepared for this project for water quality benefits as EBMUD does not current sustain any monetary fines as a result of the water quality violations and as water treatment costs will not change substantially as a result of the new water supply.

Distribution of Project Benefits and Identification of Beneficiaries

The water quality benefits afforded the Camanche Regional Water Treatment Plant Phase 1 Project will accrue to local households in the Camanche South Shore Recreation Area and are therefore local in nature. For the Camanche Regional Water Treatment Plant project as a whole, the benefits of the project will accrue to both Camanche South Shore and North Shore Recreation Areas initially, and then to the communities of Lake Camanche Village, Burson and Wallace long-term. In this manner, the benefits will be both local and regional in nature.

Project Benefits Timeline Description

Construction of Phase 1 of the overall Camanche Regional Water Treatment Plant Project will provide a higher-quality raw water source to the existing Camanche Water Treatment Plant and should result in an immediate improvement in treatment efficiency and a better potable water product. Additionally, implementation of the Phase 1 project will immediately result in reduced bacterial loading to the existing water treatment plant which will, in turn, immediately reduced the number of Surface Water Treatment Rules violations at the plant. The level of uncertainty associated with these benefits is low due to the understanding and design of the existing water treatment plant, and the high level of engineering experience and expertise exercised by EBMUD employees in pipeline design and construction.

Additional benefits will be obtained from implementation of the overall Camanche Regional Treatment Plant project; however these benefits will not realized until the remaining components have been constructed. The implementation schedule for the remaining (non-Phase1) components of the regional WTP has not been determined and will be strongly determined by available funding. Once the new water treatment plant and cross-Camanche pipeline have been constructed, additional water quality and water reliability benefits will be achieved by CANS in addition to CASS. Further benefits will be achieved when the new water treatment plant is completely built-out (serving 2 MG of treated water annually) and the outlying local communities of Lake Camanche Village, Burson and Wallace are connected to the system. While the benefits to be achieved from full project implementation are reasonably certain (that is, there is a low degree of uncertainty associated with the benefits realization), the timing of the various project components is highly uncertain.

Potential Adverse Effects from the Project

Possible impacts from the Camanche Regional Water Treatment Plant Phase 1 Project are all short-term construction-related impacts and may included possible increased sediment runoff resulting from the cut-and-cover pipeline installation method. Environmental documentation prepared for the overall project indicated that all potential environmental impacts could be mitigated, and provided recommended mitigation measures to be implemented at the time of project construction. To this end, all impacts resulting from project implementation will be less than significant in nature.

For the Camanche Regional Water Treatment Plant Project as a whole, potential adverse impacts anticipated to be minimal and mostly construction related. As before, environmental documentation prepared for the overall project indicated that all potential environmental impacts could be mitigated, and provided recommended mitigation measures to be implemented at the time of project construction. To this end, all impacts resulting from overall project implementation will be less than significant in nature

Summary of Findings

Potable water quality will be improved with implementation of the Camanche Regional Water Treatment Plant Phase 1 Project as a result of the improved raw water source that would be supplied by the new Mokelumne Aqueduct to CSS WTP pipeline and the use of Pardee Reservoir water as the raw water source. Additionally, the useful life of the existing WTP will be extended by providing higher-quality raw water in that the bacterial loading to the existing plant will be reduced and there will be fewer Surface Water Treatment Rules violations. These benefits will be realized immediately following pipeline completion, and there is little to no uncertainty associated with achieving these benefits.

Construction of the overall Camanche Regional Water Treatment Plant Project will provide substantial more benefits, but the level and timing of these benefits is uncertain. The fully completed project will provide a high-quality potable water to several Camanche Reservoir communities that are currently depended on an over-drafted groundwater supply. Project implementation will allow these communities to conjunctively manage their groundwater supplies with a higher-quality, reliable surface water source, thereby ensuring the sustainability the groundwater basin and the economic viability of these small communities. Additionally, the development and operation of a regional water treatment plant will provide economies of scales relative to water treatment, and will help keep water rates to a level affordable by the communities.

References

Personal communications with Tom Francis, Senior Civil Engineer, and Eileen White, Manager of Operations, November and December 2010.